

### REMARKS

Applicant has amended claims 1 and 16 to more particularly point out and distinctly claim the subject matter which he regards as his invention. Support for the amendment can be found in original claims 10 and 12. Applicant has also amended claim 12 by removing two members from the Markush group recited in this claim. Applicant has further added new claim 18, support of which appears at page 6, lines 10-14 of the Specification. Finally, Applicant has corrected minor deficiencies in claims 2-3 and 16. No new matter has been introduced by the amendments.

Claims 1-18 are currently pending. Reconsideration of the application, as amended, is respectfully requested in view of the remarks below.

### Objections

The Examiner objected to claims 2 and 16 on the ground that the phrase "in the state of a physically mixed" recited in each claim is informal. Applicant has replaced the phrase "physically mixed," both occurrences, with "physical mixture." Support for this replacement can be found in the Specification, page 7, lines 9-11.

The Examiner also objected to claim 3, and suggested that the clause "as homogeneous physical mixture" recited in this claim be changed to "as a homogeneous physical mixture." Applicant has amended claim 3 accordingly.

### Rejection under 35 U.S.C. 102(b)

The Examiner rejected claims 1-12 and 16-17 as being anticipated by Kato et al., EP 0365308 A2 ("Kato").

Amended claim 1 is drawn to an exhaust gas purifying catalyst, which includes a composite oxide and a zeolite. The composite oxide contains zirconium, manganese, and, optionally, cobalt. The zeolite is a proton zeolite, or a zeolite modified with cerium, lanthanum, phosphorus, boron, gallium, magnesium, or a mixture of two or more of these elements.

The Examiner correctly pointed out that "Kato et al. discloses an exhaust gas purifying catalyst wherein the catalyst comprises Co supported by Zr oxide mixed with a zeolite (see abstract)." See the Office Action, page 2, lines 21-22.

On the other hand, the Examiner erred in stating that "the zeolite [in Kato's catalyst] is a hydrogen type mordenite ..." and "the zeolite may be modified with [calcium] ..." See the Office Action, page 3, lines 3-4. The zeolite disclosed in Kato is a copper-substituted type zeolite, rather than a hydrogen type mordenite or a calcium type zeolite. See the Abstract, page 2, lines 37-40. According to Kato, the copper-substituted type zeolite is obtained by immersing powder of about 1 to 10 M of a hydrogen-, sodium-, or calcium-type zeolite in an aqueous copper salt solution. See page 3, lines 29-32. Apparently, the Examiner has confused the starting materials (e.g., a hydrogen- or calcium-type zeolite) with the zeolite in the resultant catalyst (i.e., a copper-substituted type zeolite).

In sum, Kato does not disclose a catalyst containing (1) a proton zeolite (i.e., a hydrogen type zeolite) or (2) a zeolite modified with cerium, lanthanum, phosphorus, boron, gallium, magnesium, or mixtures of these elements, which is required by amended claim 1. Therefore, claim 1, as well as claims 2-12 and 18 dependent from it, is not anticipated by Kato.

Amended claim 16 is drawn to a method for purifying NO<sub>x</sub> in an exhaust gas by using a catalyst of claim 1. For the reasons set forth above, claim 16 is not anticipated by Kato. Neither is claim 17 dependent from claim 16.

**It is submitted that claims 1-12 and 16-17, not subjected to other grounds of rejection, are now in condition for allowance.**

Rejection under 35 U.S.C. 103(a)

The Examiner rejected claims 13-15 as being obvious over Kato in view of Montreuil et al., U.S. Patent 5,328,672 ("Montreuil").

Each of claims 13-15 is drawn to a catalyst of claim 1 having two components. The first component (i.e., a composite oxide) further contains at least one element selected from the group consisting of bismuth, iron, cerium, praseodymium, gadolinium, lanthanum, barium, strontium, calcium, cesium, yttrium, and mixtures thereof. The second component (i.e., a zeolite) is a proton zeolite, or a zeolite modified with at least one element selected from the group consisting of cerium, lanthanum, phosphorus, boron, gallium, magnesium, and mixtures thereof.

The Examiner pointed out that Montreuil discloses a dual-phase catalyst having a transition metal-containing zeolite phase and a transition metal-containing oxide phase. The

oxide phase is comprised of zirconium oxide and transition metals, such as manganese, copper, cobalt, iron, calcium, and mixtures thereof. The Examiner then proceeded to conclude that it would have been obvious to one of ordinary skill in the art to modify Kato's catalysts based on the teachings of Montreuil. See the Office Action, page 4, lines 3-12. Applicant disagrees.

Montreuil discloses a catalyst in which the transition metals in the oxide and zeolite phases are copper, cobalt, nickel, chromium, iron, manganese, silver, zinc, and calcium. It does not disclose or suggest a catalyst containing a proton zeolite or a zeolite modified with cerium, lanthanum, phosphorus, boron, gallium, and magnesium, as required by each of claims 13-15. Montreuil explicitly states that (1) "[t]he transition metal[s] present in the two materials [i.e., the oxide and zeolite phases] of this catalyst preferably are the same ..." and (2) "[p]referably, this transition metal is copper." See column 2, lines 23-27; emphases added. In view of these two statements, Montreuil **teaches away** from claims 13-15, each of which covers a catalyst in which (1) the composite oxide contains transition metals different from those in the zeolite; and (2) the zeolite contains no transition metal or contains a transition metal that is not copper or any of the other metals disclosed in Montreuil.

As discussed above, Kato does not disclose or suggest a catalyst containing a proton zeolite or a zeolite modified with cerium, lanthanum, phosphorus, boron, gallium, and magnesium, as required by each of claims 13-15. As also discussed above, Montreuil **teaches away** from claims 13-15, let alone curing the deficiency in Kato. Thus, claims 13-15 are not rendered obvious by Kato and Montreuil. In other words, the Examiner has failed to establish a *prima facie* case of obviousness.

Even if a *prima facie* case of obviousness has been made (which Applicants do not concede), it can be successfully rebutted by a showing of an unexpected advantage of an exhaust gas purifying catalyst covered by each of claims 13-15. See Mr. Tatsuya Yoshikawa's Declaration ("Declaration"), a copy of which is attached hereto as "Exhibit A."

In the Declaration, Experiments 1-2 describe the preparation and performance of two claimed catalysts; and Comparative Experiments 1-3 describe the preparation and performance of three prior art catalysts. In particular, Experiment 2 describes the preparation and performance of a catalyst containing oxides of manganese, cerium, and zirconium, and H-ZSM5 (a proton zeolite); and Comparative Experiment 2 describes the preparation and performance of a

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catalyst disclosed in both Montreuil and Kato, i.e., a catalyst containing oxides of copper and zirconium, and Cu-ZSM5 (a zeolite modified with copper). The catalyst described in Experiment 2 shows a much higher NO<sub>x</sub> conversion rate (75%) than that of the catalyst described in Comparative Experiment 2 (36%). See Table A of the Declaration. Given this unexpected advantage, claims 13-15 are clearly not rendered obvious by Kato and Montreuil.

### CONCLUSION

Applicant submits that the grounds for rejection asserted by the Examiner have been overcome, and that claims 1-18, as pending, define subject matter that is novel and non-obvious. On this basis, it is submitted that all claims are now in condition for allowance, an action of which is requested.

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: \_\_\_\_\_

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